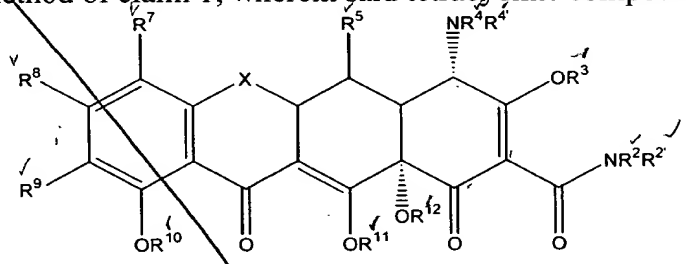
CLAIMS

1. A method for controlling *Cryptosporidium parvum* in a mammal, comprising administering to said mammal an effective amount of a tetracycline compound, such that *Cryptosporidium parvum* is controlled in said mammal.

2. The method of claim 1, wherein said tetracycline compound is of formula I:



(I)

wherein:

X is $CHC(R^{13}Y'Y)$, CHR^6, S, NR^6, or O;

R^2, R^4 and $R^{4'}$ are each hydrogen, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, arylalkyl, aryl, heterocyclic, heteroaromatic or a prodrug moiety;

$R^{2'}$, R^3, R^{10}, R^{11} and R^{12} are each hydrogen or a pro-drug moiety;

R^5 is hydroxy, hydrogen, thiol, alkanoyl, aroyl, alkaroyl, aryl, heteroaromatic, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or an arylalkyl;

R^6, R^7, R^8 and R^9 are each independently hydrogen, hydroxyl, halogen, thiol, alkyl, alkenyl, alkynyl, aryl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or an arylalkyl;

R^{13} is hydrogen, hydroxy, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or an arylalkyl;

Y' and Y are each independently hydrogen, halogen, hydroxyl, cyano, sulfhydryl, amino, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or an arylalkyl;

and pharmaceutically acceptable salts thereof.

3. The method of claim 2, wherein R^2, $R^{2'}$, R^3, R^{10}, R^{11}, and R^{12} are each hydrogen or a prodrug moiety.

4. The method of claim 2, wherein R^4 and $R^{4'}$ are each alkyl.

5. ~~The method of claim 5, wherein R^4 and $R^{4'}$ are each methyl.~~

6. The method of claim 2, wherein R^5 is alkanoyl.

7. The method of claim 5, wherein R^5 is an ester.

8. The method of claim 7, wherein R^5 is a propanoic ester.

9. The method of claim 2, wherein R^5 is hydroxyl.

10. The method of claim 2, wherein R^5 is hydrogen.

11. The method of claim 2, wherein X is S.

12. The method of claim 2, wherein X is CHR^6.

13. The method of claim 12, wherein R^6 is alkyl.

14. The method of claim 13, wherein R^6 is methyl.

15. The method of claim 2, wherein R^6 comprises a heteroatom.

16. The method of claim 15, wherein R^6 comprises a sulfur atom.

17. The method of claim 16, wherein R^6 is a thioether.

18. The method of claim 17, wherein R^6 is a cyclopentylthio ether.

19. The method of claim 2, wherein R^9 is hydrogen.

20. The method of claim 2, wherein R^9 is alkyl or alkenyl.

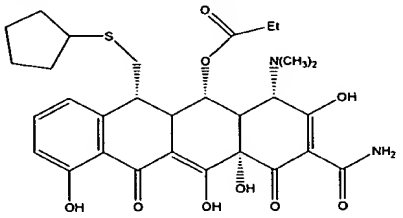
21. The method of claim 20, wherein R^9 is cyclopentenyl.

22. The method of claim 20, wherein R^9 is t-butyl.

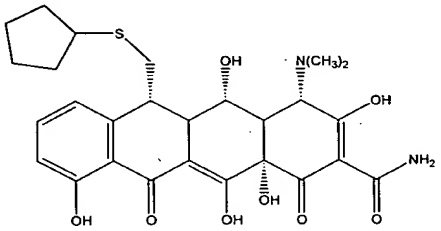
23. The method of claim 2, wherein R^9 is alkynyl.

24. The method of claim 22, wherein R^9 is 2-cyclohexenyl-ethynyl.

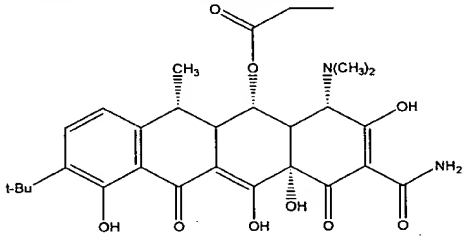
25. The method of claim 1, wherein said tetracycline compound is of the formula:



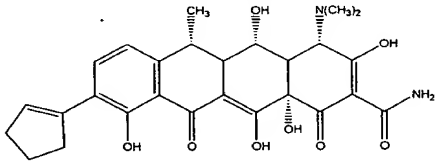
26. The method of claim 1, wherein said tetracycline compound is of the formula:



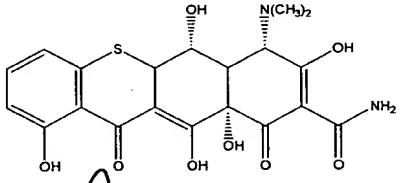
27. The method of claim 1, wherein said tetracycline compound is of the formula:



28. The method of claim 1, wherein said tetracycline compound is of the formula:

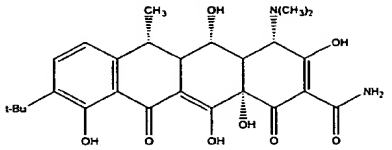


29. The method of claim 1, wherein said tetracycline compound is of the formula:

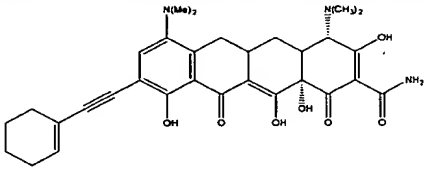


30. The method of claim 1, wherein said tetracycline compound is doxycycline.

31. The method of claim 1, wherein said tetracycline compound is of the formula:



32. The method of claim 1, wherein said tetracycline compound is of the formula:



33. The method of claim 1, wherein said mammal is immunocompetent.

34. The method of claim 1, wherein said mammal is immunocompromised.

35. The method of claim 1, wherein said mammal is a human.

36. The method of claim 35, wherein said human has an immunodeficiency.

37. The method of claim 36, wherein said human has AIDS.

38. The method of claim 36, wherein said human has undergone chemotherapy.

39. The method of claim 1, wherein said effective amount is effective to treat a *Cryptosporidium parvum* related disorder in said mammal.

40. The method of claim 37, wherein said *Cryptosporidium parvum* related disorder is diarrhea.

41. The method of claim 37, wherein said *Cryptosporidium parvum* related disorder is cryptosporidiosis.

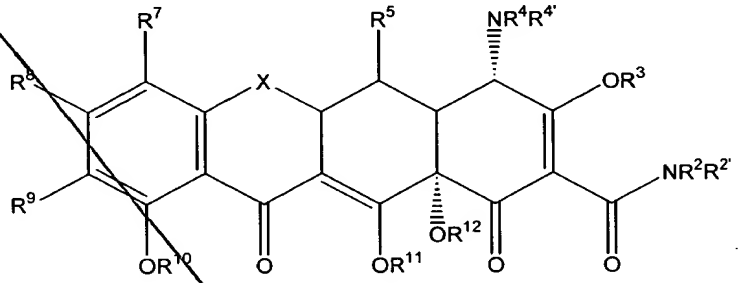
42. The method of claim 1, wherein said tetracycline compound inhibits more than 70% of *Cryptosporidium parvum* at a concentration less than 100 μg/ml.

43. The method of claim 41, wherein said tetracycline compound inhibits more than 70% of *Cryptosporidium parvum* at a concentration less than 10 μg/ml.

44. The method of claim 43, wherein said tetracycline compound inhibits more than 70% of *Cryptosporidium parvum* at a concentration less than 1 μg/ml.

45. A method for treating a *Cryptosporidium parvum* related disorder in a mammal, comprising administering to said mammal an effective amount of a tetracycline compound such that said mammal is treated for said disorder.

46. The method of claim 45, wherein said tetracycline compound is of formula I:



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wherein:

X is $CHC(R^{13}Y'Y)$, CHR^6, S, NR^6, or O;

R^2, R^4, and $R^{4'}$ are each independently hydrogen, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, arylalkyl, aryl, heterocyclic or heteroaromatic;

$R^{2'}$, R^3, R^{10}, R^{11} and R^{12} are each hydrogen or a pro-drug moiety;

R^5 is hydroxy, hydrogen, thiol, alkanoyl, aroyl, alkaroyl, aryl, heteroaromatic, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or arylalkyl;

R^6, R^7, R^8 and R^9 are each independently hydrogen, hydroxyl, halogen, thiol, alkyl, alkenyl, alkynyl, aryl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or arylalkyl;

R^{13} is hydrogen, hydroxy, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or arylalkyl;

Y' and Y are each independently hydrogen, halogen, hydroxyl, cyano, sulfhydryl, amino, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylamino, or arylalkyl;

and pharmaceutically acceptable salts thereof.

47. The method of claim 46, wherein R^2, $R^{2'}$, R^3, R^{10}, R^{11}, and R^{12} are each hydrogen or a prodrug moiety.

48. The method of claim 47, wherein R^4 and $R^{4'}$ are each methyl.

49. The method of claim 48, wherein R^5 is alkanoyl, an ester group, a hydroxyl group or hydrogen.

50. The method of claim 48, wherein X is S or CHR^6.

51. The method of claim 50, wherein R^6 is alkyl.

52. The method of claim 50, wherein R^6 comprises a heteroatom.

53. The method of claim 52, wherein R^6 is a thioether.

54. The method of claim 46, wherein R^9 is hydrogen, alkyl, alkenyl, or alkynyl.

55. The method of claim 54, wherein R^9 is cyclopentenyl.

56. The method of claim 54, wherein R^9 is t-butyl.

57. The method of claim 54, wherein R^9 is 2-cyclohexenyl-propynyl.

58. The method of claim 46, wherein said tetracycline compound is selected from the group consisting of 5-propionyl-6-cyclopentylsulfanylmethyl doxycycline; thiatetracycline; 9-cyclopent-1-enyl-doxycycline; 5-propionyl-9-tert-butyl-doxycycline; doxycycline; 9-tert-butyl doxycycline; 9-cyclohex-1-enylethynyl minocycline; and 6-cyclopentylsulfanylmethyl doxycycline.

59. The method of claim 46, wherein said mammal is immunocompetent.

60. The method of claim 46, wherein said mammal is immunocompromised.

61. The method of claim 46, wherein said mammal is a human.

62. The method of claim 61, wherein said human is immunodeficient.

63. The method of claim 62, wherein said human has AIDS.

64. The method of claim 62, wherein said human has undergone chemotherapy.

65. The method of claim 46, wherein said effective amount is effective to treat a *Cryptosporidium parvum* related disorder in said mammal.

66. The method of claim 65, wherein said *Cryptosporidium parvum* related disorder is diarrhea.

67. The method of claim 65, wherein said *Cryptosporidium parvum* related disorder is cryptosporidiosis.

68. The method of claim 46, further comprising the administration of a pharmaceutically acceptable carrier.

69. The method of claim 46, further comprising the administration of a supplementary anti-*Cryptosporidium parvum* agent.

70. The method of claim 46, wherein said supplementary agent is paromomycin or a derivative thereof.

71. A pharmaceutical composition comprising an effective amount of a tetracycline compound to treat a *Cryptosporidium parvum* related disorder in a mammal and a pharmaceutically acceptable carrier.

72. The pharmaceutical composition of claim 71, wherein said tetracycline compound is selected from the group consisting of: 5-propionyl-6-cyclopentylsulfanylmethyl doxycycline; thiatetracycline; 9-cyclopent-1-enyl-doxycycline; 5-propionyl-9-tert-butyl-doxycycline; doxycycline; 9-tert-butyl doxycycline; 9-cyclohex-1-enylethynyl minocycline; and 6-cyclopentylsulfanylmethyl doxycycline.

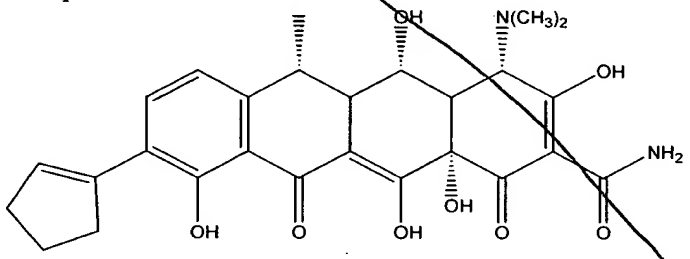
73. The pharmaceutical composition of claim 71, wherein said tetracycline compound is 9-cyclopent-1-enyl-doxycycline.

74. The pharmaceutical composition of claim 71, wherein said *Cryptosporidium parvum* related disorder is cryptosporidoisis.

75. The pharmaceutical composition of claim 71, wherein said *Cryptosporidium parvum* related disorder is diarrhea.

76. The pharmaceutical composition of claim 71, further comprising an effective amount of a supplementary anti-*Cryptosporidium parvum* agent.

77. A tetracycline compound of the formula:



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